OFSTEST Introduction

Purpose

The Operational Forecast System (OFS) test scenario (OFSTEST) is a hypothetical data set which exercises the capabilities and features of the National Weather Service River Forecast System (NWSRFS) Operational Forecasting System (OFS) component.

OFSTEST was designed to represent the use of OFS at the level of a NWS River Forecast Center (RFC) and to be used to test new features and to train users in the use of the system. The river basins and sub-basins defined in OFSTEST reflect the wide variety of hydrologic regimes found in the United States. For training as well as testing purposes OFSTEST required a sequence for the setup and maintenance of the OFS data bases and simulation of an operational forecasting situation.

These requirements were met by identifying representative river basins where NWSRFS has been implemented throughout the country. The general characteristics and model parameters of these basins were used to develop a hypothetical system of rivers in one area with hydrologic and hydraulic routing models to link the individual basins. Additional components were added to permit the application of as many features of the system as possible. Model parameters for the basins were revised as necessary to reflect changes in basin areas and shapes and mean areal precipitation (MAP) areas and station characteristics were likewise revised. To simulate an operational forecasting situation, a synthetic storm with a duration of about three days was developed which had characteristics necessary to produce a desired hydrologic response that would exercise particular features the various models. The storm produced less precipitation in the northern portion of the area, but the initial conditions in that area included a snow pack and a temperature sequence was developed to allow a simulation of snowmelt. The precipitation and temperature sequences were used to estimate point precipitation and temperature data for stations.

A final aspect in the development of OFSTEST was the preparation of time series representing observations of river and reservoir conditions. Because input data are not completely accurate and existing hydrologic models are not capable of completely representing the true hydrologic systems, observations of hydrologic response are typically used in operational forecasting to provide guidance in the selection of run-time modifications (MODs) which can improve the accuracy of the forecast. To develop a training situation in which the observations would differ from the simulation results two versions of the files used to represent the hypothetical area were developed. One version was prepared which was to represent the true hydrometeorologic and hydrologic conditions and was referred to as the 'truth' version of OFSTEST. It included various run-time modifications to the model inputs and parameters which were intended to reflect the difference between true conditions and the limitations of the data collection network and inaccuracies in model states at a given time. The results computed from this model were then defined as

observations. The other version of OFSTEST files (the training version) included alterations to model parameters and states as additional sources of variation from the truth version of OFSTEST to simulate the difference between optimized model calibrations and actual watershed response characteristics, which cannot be represented completely by calibrated models. To distinguish between these versions of OFSTEST files the 'truth' version will be referred to as 'OFSTRUTH' while the training version will be referred to as 'OFSTEST'. The complete set of files and data associated with the NWSRFS Training Dataset in general will be referred to simply as the 'dataset'.

The dataset provides for training at a number of levels. It provides a framework for the development and testing of new features and of enhancements to existing features of the system. Hydrologic forecasters can be trained in the use of the system and in forecasting techniques. System support staff can be trained in the setup and maintenance of the databases. Finally, it allows for training of individuals who provide products or services that interact with NWSRFS by providing them with an overview of the forecast system.

Synthetic Storm

The synthetic storm developed for the dataset was designed to resemble a true storm pattern and to generate a specified hydrologic response in order to exercise certain features of the forecast system.

The storm is represented by a series of six-hour isohyets of precipitation accumulation extending over a period of three and a half days. The storm can actually be considered as two separate events. The first storm moves from south to north across the area with precipitation tapering off as it reaches the northern extent of the area. The second storm enters from the southeast and crosses the southern half of the area toward the northwest.

Gridded Precipitation Data

The 6-hour accumulations for the synthetic storm were disaggregated to 1-hour accumulations and radar-like noise fields were superimposed on the gridded representations of the hourly accumulations to create gridded precipitation data in xmrg format.

Acknowledgments

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The original OFSTEST dataset was created by Eric Anderson.

The 6-hour accumulations for the synthetic storm were disaggregated to 1-hour accumulations to create the xmrg files by Riverside Technology, inc.